UNIVERSITI TEKNOLOGI MARA

NATURAL RADIONUCLIDES DISTRIBUTION IN SOIL, AND LINKAGES IN WATER, SEDIMENT, AND SELECTED FISHES IN KUALA KENIAM, TAMAN NEGARA, PAHANG, MALAYSIA

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA (UiTM), regulating the conduct of my study and research.

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ABSTRACT

Naturally occurring radionuclides such as ^{226}Ra, ^{228}Ra and ^{40}K which emit gamma radiation through their decay process could reach the human. The amount of radioactivity concentration of these radionuclides is the important factor in assessing whether it is harmful or vice versa. In this study, the Kuala Keniam, Taman Negara, Pahang was chosen as a study area, since Taman Negara is an undisturbed area and reserve for natural or semi natural land and restricted from most development in Malaysia. In this area, depending on the geological condition of the surrounding, it may contain some natural radionuclides which emit certain amount or levels of radiation. The gamma activities and the concentration of radionuclides were determined using high resolution gamma-ray spectrometer and EDXRF respectively. In this study, the area is divided into three areas based on their location; Zone 1 is in the base camp, Zone 2 is in the jungle and Zone 3 is at Keniam River. The activity concentration of soil in Zone 1 is higher than Zone 2 because of the geographical condition between both Zones. The mean activity concentration of water in Zone 2 is higher than Zone 3 because water in Zone 3 is more stagnant than water in Zone 2. The radiation exposure based on radium equivalent (Ra_{eq}), absorbed dose (D), annual effective dose (AED), external hazard index (H_{ex}) and internal hazard index (H_{in}) via analysis of ^{226}Ra, ^{228}Ra, and ^{40}K was calculated. Transfer ratio from water to fish is higher than transfer ratio from sediment to fish. In short, based on the radiation index, the area is considered safe since the level of radiation is lower than the annual dose limit.

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